

DETAILED ACTION

Response to Amendment

Applicant's Amendment filed January 3, 2008 has been fully considered and entered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5 and 7-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Webjörn et al. ("Efficient quasi-phase-matched frequency doubling of a high power, unpolarized fiber laser source", *CLEO '98*, page 76; cited by Applicant).

Regarding claims 1, 2, 7, 8, 9; Webjörn et al. discloses a method and apparatus for frequency conversion of a non-polarized (unpolarized) optical light beam (the unpolarized light beam is emitted from the Fiber laser; see Figure 1), comprising:

- splitting a non-polarized optical light beam (see the paragraph at the bottom of column 2 and the top of column 3; the light is essentially unpolarized) into two orthogonally polarized beams with a beam splitter

(the calcite prism shown in Figure 1 is a beam displacing prism that splits the fiber laser output into two parallel, orthogonally polarized beams);

- forming said polarized beams and rotating their polarizations with beam forming optics (the $\lambda/2$ waveplates); and
- pumping an optical frequency converter (periodically poled LiNbO_3 (PPLN) waveguide) with the polarized beams, wherein the optical frequency converter comprises a non-linear crystal placed within a common cavity and the common cavity is pumped by the polarized beams;
- wherein two orthogonally polarized beam jointly pump one type II phase matched frequency conversion process.

Regarding claims 3, 10; Figure 1 of Webjörn et al. disclose an optical isolator placed in the beam path thereby preventing reflection-returned light from the wavelength converter from entering into the pump laser.

Regarding claims 4, 11; both beams are focused together in one spot within the frequency converter (see Figure 2) thereby generating one converted beam.

Regarding claims 5, 12; the frequency converter comprises a non-linear crystal (PPLN) placed within a cavity, and the common cavity is pumped by the polarized beams (see Figure 1).

Claims 1, 2, 5-9, 12 and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Batchko et al. (US 2002/0179912 A1).

Regarding claims 1, 2, 6-9 and 13; Batchko et al. discloses a method and apparatus for frequency conversion of a non-polarized optical light beam (see Figures 1A and 1B), comprising:

- splitting a non-polarized optical light beam into two orthogonally polarized beams with a beam splitter (13);
- forming said polarized beams and rotating their polarizations with beam forming optics ($\lambda/2$ waveplate, 16);
- pumping an optical frequency converter (PPLN waveguide, 10) with the polarized beams, wherein the optical frequency converter comprises a non-linear crystal placed within a common cavity and the common cavity is pumped by the polarized beams; and
- combining the two generated polarized beams into one beam by means of a polarization beam combiner (13).

Regarding claims 5, 12; the frequency converter comprises a non-linear crystal (PPLN) placed within a cavity, and the common cavity is pumped by the polarized beams (see Figure 1).

Response to Arguments

Applicant's arguments filed January 3, 2008 have been fully considered but they are not persuasive.

Applicant states that the references of record do not teach a non-linear crystal placed within a common cavity. The non-linear crystal of each reference, however, is within a common cavity and is therefore located or placed within that cavity. The

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different methods of forming the non-linear crystal and/or the fact that the crystal may be monolithically formed does not mean that the crystal is not placed within the cavity. The crystal is located within the common cavity in the prior art of record.

Applicant states that the claim has been amended to show that it is not necessary to rotate both beams but rather that the polarization of one of the beams may be rotated. The translation term “comprising”, which is synonymous with “including”, “containing”, or “characterized by,” is inclusive or open-ended and does not exclude additional, unrecited elements or method steps. *Moleculon Research Corp. v. CBS, Inc.*, 793 F.2d 1261, 229 USPQ 805 (Fed. Cir. 1986) *In re Baxter*, 656 F.2d 679, 210 USPQ 795, 803 (CCPA 1981); *Ex parte Davis*, 80 USPQ 448, 450 (Bd. App. 1948) (“comprising” leaves “the claim open for the inclusion of unspecified ingredients even in major amounts”). Therefore, an invention where both beams are rotated includes at least one beam that is rotated and reads on the claims of the present application.

Applicant states that the method of claim 2 has not been addressed. The method of claim 2 is directed to the same patentable invention as the method of claims 1 and 7, and the applied prior art inventions disclose a non-polarized optical light beam that is converted by jointly pumping a non-linear crystal with two orthogonally polarized beam, thereby jointly pumping one, type II phase matched frequency conversion process with two orthogonally polarized beams.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning the merits of this communication should be directed to Examiner Michelle R. Connelly-Cushwa at telephone number (571) 272-2345. The examiner can normally be reached 9:00 AM to 7:00 PM, Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney B. Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general or clerical nature should be directed to the Technology Center 2800 receptionist at telephone number (571) 272-1562.

/Michelle R. Connelly-Cushwa/
Primary Patent Examiner, AU 2874
April 11, 2008